

THE ASTROPHYSICAL JOURNAL  
CONTENTS OF VOLUME 410, PART 1

1993 JUNE 10, Number 1

	<i>Page</i>	<i>Fiche</i>
SMALL-SCALE SUBSTRUCTURE IN RELAXED CLUSTERS. I. STATISTICAL CHARACTERIZATION <i>Eduard Salvador-Solé, Guillermo González-Casado, &amp; José María Solanes</i>	1	112-B1
SMALL-SCALE SUBSTRUCTURE IN RELAXED CLUSTERS. II. CLUSTERING MODEL <i>Guillermo González-Casado, José María Solanes, &amp; Eduard Salvador-Solé</i>	15	112-C8
DISCOVERY OF A NEW COMPONENT IN THE GRAVITATIONALLY LENSED QUASAR 0957+561 <i>C. Jones, C. Stern, E. Falco, W. Forman, L. David, I. Shapiro, &amp; A. C. Fabian</i>	21	112-D1
QUASAR X-RAY SPECTRA REVISITED <i>P. Shastri, B. J. Wilkes, M. Elvis, &amp; J. McDowell</i>	29	112-D11
IS 1308+326 A BL LACERTAE OBJECT OR A QUASAR? <i>D. C. Gabuzda, R. I. Kollgaard, D. H. Roberts, &amp; J. F. C. Wardle</i>	39	112-E12
EVOLUTION OF ELLIPTICAL GALAXIES. I. THE MULTIPHASE MODEL <i>Federico Ferrini &amp; Bianca Maria Poggianti</i>	44	112-F4
THE PECULIAR BALMER LINE PROFILES OF OQ 208 <i>P. Marziani, J. W. Sulentic, M. Calvani, E. Perez, M. Moles, &amp; M. V. Penston</i>	56	112-G4
DENSITY WAVE KINEMATICS AND GIANT MOLECULAR ASSOCIATION FORMATION IN M51 <i>Richard J. Rand</i>	68	113-A3
INFRARED SURFACE BRIGHTNESS FLUCTUATIONS: $K'$ -BAND OBSERVATIONS OF M31, M32, AND THE DISTANCE TO MAFFEI 1 <i>Gerard A. Luppino &amp; John L. Tonry</i>	81	113-B3
GAMMA RADIATION FROM BLAZAR PKS 0537-441 <i>D. J. Thompson, D. L. Bertsch, C. E. Fichtel, R. C. Hartman, S. D. Hunter, G. Kanbach, D. A. Kniffen, P. W. Kwok, Y. C. Lin, J. R. Mattox, H. A. Mayer-Hasselwander, P. F. Michelson, C. von Montigny, P. L. Nolan, K. Pinkau, E. J. Schneid, &amp; P. Sreekumar</i>	87	113-C1
THE HYADES CLUSTER-SUPERCLUSTER CONNECTION: EVIDENCE FOR A LOCAL CONCENTRATION OF DARK MATTER <i>Stefano Casertano, Icko Iben, Jr., &amp; Aaron Shiels</i>	90	113-C5
THEORETICAL MODELS FOR MASSIVE STARS IN YOUNG MAGELLANIC CLOUD STELLAR CLUSTERS <i>Enzo Brocato &amp; Vittorio Castellani</i>	99	113-D1
VLA OBSERVATIONS OF 1E 1740.7-2942: A SEARCH FOR RADIO RECOMBINATION LINES OF POSITRONIUM <i>K. R. Anantharamaiah, K. S. Dwarakanath, D. Morris, W. M. Goss, &amp; V. Radhakrishnan</i>	110	113-E1
ULTRAVIOLET PROPERTIES OF INDIVIDUAL HOT STARS IN GLOBULAR CLUSTER CORES. I. NGC 1904 (M79) <i>B. Altner &amp; T. A. Matilsky</i>	116	113-E8
A SIMILARITY SOLUTION TO THE KINEMATIC $\alpha^2\omega$ DYNAMO EQUATION WITH TIME-DEPENDENT COEFFICIENTS <i>Chung-Ming Ko</i>	128	113-F8
THE NATURE OF THE MOLECULAR CORES IN HIGH-LATITUDE CIRRUS CLOUDS. IV. THE ELECTRON DISTRIBUTION AND THE ABUNDANCE AND CHEMISTRY OF $H_2CO$ <i>B. E. Turner</i>	140	113-G8
COLLAPSE AND FRAGMENTATION OF MOLECULAR CLOUD CORES. I. MODERATELY CENTRALLY CONDENSED CORES <i>Alan P. Boss</i>	157	114-B1
AN INFRARED SURVEY FOR EMBEDDED YOUNG STARS IN THE PERSEUS MOLECULAR CLOUD COMPLEX <i>E. F. Ladd, E. A. Lada, &amp; P. C. Myers</i>	168	114-C1

	Page	Fiche
EXTENDED CO(7→6) EMISSION FROM WARM GAS IN ORION <i>J. E. Howe, D. T. Jaffe, E. N. Grossman, W. F. Wall, J. G. Mangum, &amp; G. J. Stacey</i>	179	114-D1
THE FORMATION OF CYANOPOLYNE MOLECULES IN IRC +10216 <i>Isabelle Cherchneff, Alfred E. Glassgold, &amp; Gary A. Mamon</i>	188	114-D12
FROM BIPOLAR TO QUADRUPOLE: THE COLLIMATION PROCESSES OF THE CEPHEUS A OUTFLOW <i>José M. Torrelles, Lourdes Verdes-Montenegro, Paul T. P. Ho, Luis F. Rodríguez, &amp; Jorge Cantó</i>	202	114-F1
THE STRUCTURE OF PROTOSTELLAR ACCRETION DISKS AND THE ORIGIN OF BIPOLAR FLOWS <i>Mark Wardle &amp; Arieh Königl</i>	218	114-G6
ON THE DISTANCE TO GALACTIC PLANETARY NEBULAE <i>C. Y. Zhang</i>	239	115-B1
SEARCH FOR IONIZED CORES IN PROTO-PLANETARY NEBULAE, AND THE ASYMPTOTIC GIANT BRANCH TO PLANETARY NEBULA TRANSITION <i>Hans Ulrich Käufel, Alvio Renzini, &amp; Letizia Stanghellini</i>	251	115-C1
A HIGHLY SENSITIVE RADIO SURVEY OF SYMBIOTIC STARS AT 3.6 CENTIMETERS <i>E. R. Seaquist, M. Krogulec, &amp; A. R. Taylor</i>	260	115-C12
JHK PHOTOMETRY OF WD 0950+139 <i>Michael S. Fulbright &amp; James Liebert</i>	275	115-E1
HYDRODYNAMICS OF WINDS FROM IRRADIATED COMPANION STARS IN LOW-MASS X-RAY BINARIES <i>Marco Tavani &amp; Richard London</i>	281	115-E8
THE NATURE OF THE DOPPLER SHIFT RESIDUALS AND SOME PECULIAR PHENOMENA OF SS 433 <i>T. Iijima</i>	295	115-F10
FLARING AND QUIESCENT RADIO EMISSION OF UX ARIETIS: A TIME-DEPENDENT MODEL <i>F. Chiuderi Drago &amp; E. Franciosi</i>	301	115-G3
A MODEL OF NONTHERMAL RADIATION FROM ACCRETING X-RAY PULSARS <i>P. P. Leung, K. S. Cheng, &amp; P. C. W. Fung</i>	309	115-G12
RELATIVISTIC ELECTRON-POSITRON BEAMS IN GAMMA-RAY BURSTERS <i>I. A. Smith &amp; Richard I. Epstein</i>	315	116-A6
ROSAT OBSERVATIONS OF THE LARGE MAGELLANIC CLOUD PULSAR PSR 0540-69 <i>John P. Finley, Hakki Ögelman, Günther Hasinger, &amp; Joachim Trümper</i>	323	116-B1
DISCOVERY OF ORBITAL DECAY IN SMC X-1 <i>A. Levine, S. Rappaport, J. E. Deeter, P. E. Boynton, &amp; F. Nagase</i>	328	116-B8
POLARIZATION ECLIPSE MODEL OF THE WOLF-RAYET BINARY V444 CYGNI WITH CONSTRAINTS ON THE STELLAR RADII AND AN ESTIMATE OF THE WOLF-RAYET MASS-LOSS RATE <i>N. St-Louis, A. F. J. Moffat, L. Lapointe, Yu. S. Efimov, N. M. Shakhovskoy, G. K. Fox, &amp; V. Piirola</i>	342	116-C10
ON THE MASS OF NOVA DQ HERCULIS (1934) <i>Keith Horne, William F. Welsh, &amp; Richard A. Wade</i>	357	116-E1
PLASKETT'S STAR (HD 47129): MORE AND MORE CURIOUS <i>Anne B. Underhill</i>	365	116-E11
THE s-PROCESS BETWEEN A = 120 AND 124: SIGNATURE OF NEUTRON DENSITY AND TEMPERATURE IN RED GIANTS <i>F. Käppeler, W. Schanz, K. Wisshak, &amp; G. Reffo</i>	370	116-F3
STELLAR CORONAE AT THE END OF THE MAIN SEQUENCE: A ROSAT SURVEY OF THE LATE M DWARFS <i>Thomas A. Fleming, Mark S. Giampapa, J. H. M. M. Schmitt, &amp; Jay A. Bookbinder</i>	387	116-G8
s-PROCESS Ba ISOTOPIC COMPOSITIONS IN PRESOLAR SiC FROM THE MURCHISON METEORITE <i>C. A. Prombo, F. A. Podosek, S. Amari, &amp; R. S. Lewis</i>	393	117-A1
CARBON STARS AND ISOTOPIC Ba ANOMALIES IN METEORITIC SiC GRAINS <i>R. Gallino, C. M. Raiteri, &amp; M. Busso</i>	400	117-A10
THE FREE ENERGIES OF PARTIALLY OPEN CORONAL MAGNETIC FIELDS <i>B. C. Low &amp; D. F. Smith</i>	412	117-B10

# CONTENTS

v

	Page	Fiche
THE RATIO OF OPTICAL-TO-INFRARED EMISSION LINE STRENGTHS IN Ar III AS ELECTRON DENSITY DIAGNOSTICS FOR PLANETARY NEBULAE <i>F. P. Keenan &amp; E. S. Conlon</i>	426	117-C12
Fe III EMISSION LINES IN THE OPTICAL SPECTRUM OF THE PLANETARY NEBULA IC 4997 <i>F. P. Keenan, L. H. Aller, S. Hyung, E. S. Conlon, &amp; G. A. Warren</i>	430	117-D3
1993 JUNE 20, Number 2		
A QUASI-STEADY STATE COSMOLOGICAL MODEL WITH CREATION OF MATTER <i>F. Hoyle, G. Burbidge, &amp; J. V. Narlikar</i>	437	119-B7
VOID EVOLUTION AND THE LARGE-SCALE STRUCTURE <i>John Dubinski, L. Nicolaci da Costa, D. S. Goldwirth, M. Lecar, &amp; T. Piran</i>	458	119-D1
CONTROLLED EXPERIMENTS IN COSMOLOGICAL GRAVITATIONAL CLUSTERING <i>Adrian L. Melott &amp; Sergei F. Shandarin</i>	469	119-E1
ZEL'DOVICH APPROXIMATION AND THE PROBABILITY DISTRIBUTION FOR THE SMOOTHED DENSITY FIELD IN THE NONLINEAR REGIME <i>T. Padmanabhan &amp; K. Subramanian</i>	482	119-F1
A STATIC STABLE UNIVERSE <i>David F. Crawford</i>	488	119-F9
QUASAR CLUSTERING ON LARGE SCALES <i>H. J. Mo &amp; L. Z. Fang</i>	493	119-G1
GALAXY COLORS IN DISTANT CLUSTERS AS A TEST FOR THE WORLD MODEL <i>Alberto Buzzoni, Guido Chincarini, &amp; Emilio Molinari</i>	499	119-G9
THE SIGNATURE OF THE COSMOLOGICAL REDSHIFT IN POPULATION STUDIES OF GAMMA-RAY BURST SPECTRA <i>J. J. Brainerd</i>	507	120-A5
THE SHAPES OF BRIGHTEST CLUSTER GALAXIES <i>Barbara S. Ryden, Tod R. Lauer, &amp; Marc Postman</i>	515	120-B1
SEARCHING FOR A FAR-INFRARED ENHANCEMENT IN COMPACT GROUPS OF GALAXIES <i>Jack W. Sulentic &amp; Duilia F. De Mello Rabaça</i>	520	120-B8
A PROVISIONAL RR LYRAE DISTANCE SCALE <i>Norman R. Simon &amp; Christine M. Clement</i>	526	120-C1
THE NARROW-LINE REGION OF HIGH-LUMINOSITY ACTIVE GALACTIC NUCLEI <i>Beverley J. Wills, H. Netzer, M. S. Brotherton, Mingsheng Han, D. Wills, J. A. Baldwin, G. J. Ferland, &amp; I. W. A. Browne</i>	534	120-C11
NONLOCAL AND COLLECTIVE RELAXATION IN STELLAR SYSTEMS <i>Martin D. Weinberg</i>	543	120-D8
THE CIRCUMNUCLEAR REGION OF NGC 5728 <i>S. Arribas &amp; E. Mediavilla</i>	552	120-E5
THE IONIZING RADIATION OF SEYFERT 2 GALACTIC NUCLEI <i>Luis C. Ho, Joseph C. Shields, &amp; Alexei V. Filippenko</i>	567	120-F9
THE INTERACTING SYSTEM NGC 7753-7752 (ARP 86). I. BVRI PHOTOMETRY <i>Eija Laurikainen, Heikki Salo, &amp; Antonio Aparicio</i>	574	120-G3
THE INTERACTING SYSTEM NGC 7753-7752 (ARP 86). II. N-BODY MODELING <i>Heikki Salo &amp; Eija Laurikainen</i>	586	121-A6
THE EGRET DETECTION OF QUASAR 1633+382 <i>J. R. Mattox, D. L. Bertsch, J. Chiang, B. L. Dingus, C. E. Fichtel, R. C. Hartman, S. D. Hunter, G. Kanbach, D. A. Kniffen, P. W. Kwok, Y. C. Lin, H. A. Mayer-Hasselwander, P. F. Michelson, C. von Montigny, P. L. Nolan, K. Pinkau, E. Schneid, P. Sreekumar, &amp; D. J. Thompson</i>	609	121-C5
HIGH-RESOLUTION X-RAY OBSERVATIONS OF THE CENTRAL REGION OF M31 WITH THE ROSAT SATELLITE <i>F. A. Primini, W. Forman, &amp; C. Jones</i>	615	121-C12

	Page	Fiche
NEW 325 MHz OBSERVATIONS OF H II GALAXIES: THE MECHANISMS THAT SHAPE THE UNUSUAL RADIO SPECTRA <i>Hans-Jörg Deeg, Elias Brinks, Neb Duric, Uli Klein, &amp; Evan Skillman</i>	626	121-D13
SUBMILLIMETER CONTINUUM EMISSION FROM THE GALACTIC CENTER REGION <i>W. R. F. Dent, H. E. Matthews, R. Wade, &amp; W. D. Duncan</i>	650	121-F11
4. <sub>1</sub> -3. <sub>0</sub> E METHANOL EMISSION IN G1.6-0.025 <i>Aubrey D. Haschick &amp; Willem A. Baan</i>	663	121-G12
SPECTRAL IMAGING OF THE 3.3 AND 11.3 MICRON EMISSION BANDS IN NGC 1333: DISCOVERY OF SPATIALLY SEPARATE BAND EMISSIONS <i>Jesse Bregman, David Rank, Scott A. Sandford, &amp; Pasquale Temi</i>	668	122-A5
ANGULAR BROADENING OF PULSARS AND THE DISTRIBUTION OF INTERSTELLAR PLASMA FLUCTUATIONS <i>C. R. Gwinn, N. Bartel, &amp; J. M. Cordes</i>	673	122-A13
THREE-DIMENSIONAL SIMULATIONS OF PROTOSTELLAR JETS <i>Elisabete M. de Gouveia Dal Pino &amp; Willy Benz</i>	686	122-B13
DISCOVERY OF NEW OBJECTS IN THE ORION NEBULA ON <i>HST</i> IMAGES: SHOCKS, COMPACT SOURCES, AND PROTOPLANETARY DISKS <i>C. R. O'Dell, Zheng Wen, &amp; Xihai Hu</i>	696	122-C11
THE DYNAMICS OF STELLAR OUTFLOWS DOMINATED BY INTERACTION OF DUST AND RADIATION <i>Nathan Netzer &amp; Moshe Elitzur</i>	701	122-D11
VOYAGER 2 OBSERVATIONS OF NGC 7023: DUST SCATTERING SHORTWARD OF 1600 Å <i>A. N. Witt, J. K. Petersohn, J. B. Holberg, J. Murthy, A. Dring, &amp; R. C. Henry</i>	714	122-E13
WIND-DRIVEN ANGULAR MOMENTUM LOSS IN BINARY SYSTEMS. I. BALLISTIC CASE <i>Leigh Brookshaw &amp; Marco Tavani</i>	719	122-F6
MASS LOSS FROM WOLF-RAYET STARS DUE TO RADIATION PRESSURE AND ALFVÉN WAVES <i>L. C. dos Santos, V. Jatenco-Pereira, &amp; R. Opher</i>	732	122-G11
STELLAR CORE COLLAPSE: A BOLTZMANN TREATMENT OF NEUTRINO-ELECTRON SCATTERING <i>Anthony Mezzacappa &amp; Stephen W. Bruenn</i>	740	123-A7
HIGH-FREQUENCY EMISSION OF X-RAY PULSAR 1E 2259+586 <i>V. V. Usov</i>	761	123-C1
THE BOW SHOCK AND MACH DISK OF HH 111V <i>Jon A. Morse, Steve Heathcote, Gerald Cecil, Patrick Hartigan, &amp; John C. Raymond</i>	764	123-C5
DOPPLER IMAGING STARS WITH MODERATE ROTATION: THE SPOT DISTRIBUTION ON $\alpha$ GEMINORUM <i>Artie P. Hatzes</i>	777	123-D7
ELLIPTICAL POLARIMETRY OF THE INTERACTING BINARY STAR V367 CYGNI <i>Nicholas M. Elias II</i>	785	123-E1
RESOLVING THE IRON K LINE IN CYGNUS X-2: AN OBSERVATION WITH BBXRT <i>A. P. Smale, C. Done, R. F. Mushotzky, K. A. Weaver, P. J. Serlemitsos, F. E. Marshall, R. Petre, K. M. Jahoda, E. A. Boldt, J. H. Swank, A. E. Szymkowiak, R. L. Kelley, &amp; K. Arnaud</i>	796	123-F1
HUBBLE SPACE TELESCOPE SPECTRA OF THE PHASE-MODULATED WIND IN THE SMC O+WR BINARY R31 <i>J. B. Hutchings, L. Bianchi, &amp; S. C. Morris</i>	803	123-F10
VLBI ASTROMETRIC IDENTIFICATION OF THE RADIO-EMITTING REGION IN ALGOL AND DETERMINATION OF THE ORIENTATION OF THE CLOSE BINARY <i>Jean-François Lestrade, Robert B. Phillips, Mark W. Hodges, &amp; Robert A. Preston</i>	808	123-G1
ULTRAVIOLET LINE DIAGNOSTICS OF ACCRETION DISK WINDS IN CATAclysmic VARIABLES <i>Peter Vitello &amp; Isaac Shlosman</i>	815	123-G11
ASYMMETRIES OF SOLAR OSCILLATION LINE PROFILES <i>T. L. Duvall, Jr., S. M. Jefferies, J. W. Harvey, Y. Osaki, &amp; M. A. Pomerantz</i>	829	124-A13
HIGH-RESOLUTION ABSORPTION CROSS SECTION MEASUREMENTS OF CARBON MONOXIDE AT 20 K BETWEEN 96.7 AND 98.8 NANOMETERS <i>G. Stark, K. Yoshino, P. L. Smith, J. R. Esmond, K. Ito, &amp; M. H. Stevens</i>	837	124-B8
ABSTRACTS OF THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES, 1993 JULY		
THE Hubble Space Telescope QUASAR ABSORPTION LINE KEY PROJECT. I. FIRST OBSERVATIONAL RESULTS, INCLUDING LYMAN-ALPHA AND LYMAN-LIMIT SYSTEMS <i>John N. Bahcall, Jacqueline Bergeron, Alec Boksenberg, George F. Hartig, Buell T. Jannuzi, Sofia Kirhakos, W. L. W. Sargent, Blair D. Savage, Donald P. Schneider, David A. Turnshek, Ray J. Weymann, &amp; Arthur M. Wolfe</i>	843	124-C1

## CONTENTS

vii

	Page	Fiche
THE Hubble Space Telescope QUASAR ABSORPTION LINE KEY PROJECT. II. DATA CALIBRATION AND ABSORPTION-LINE SELECTION <i>Donald P. Schneider, George F. Hartig, Buell T. Jannuzi, Sofia Kirhakos, David H. Saxe, Ray J. Weymann, John N. Bahcall, Jacqueline Bergeron, Alec Boksenberg, W. L. W. Sargent, Blair D. Savage, David A. Turnshek, &amp; Arthur M. Wolfe</i>	844	124-C2
THE RADIO PROPERTIES OF HIGH-REDSHIFT QUASARS. I. DUAL-FREQUENCY OBSERVATIONS OF 79 STEEP-SPECTRUM QUASARS AT $z > 1.5$ <i>C. J. Lonsdale, P. D. Barthel, &amp; G. K. Miley</i>	845	124-C3
A 20 CENTIMETER VLA SURVEY OF ABELL CLUSTERS OF GALAXIES. III. IMAGES AND OPTICAL IDENTIFICATIONS <i>Frazer N. Owen, Richard A. White, &amp; JingPing Ge</i>	845	124-C3
STUDIES OF GALAXY CLUSTERING THROUGH THE USE OF BINARY TREE HIERARCHIES. I. MULTIPOINT CORRELATION FUNCTIONS <i>Gregory J. Ruffa &amp; David H. Porter</i>	846	124-C4
N-BODY REALIZATIONS OF COMPOUND GALAXIES <i>Lars Hernquist</i>	846	124-C4
A SEARCH FOR HERBIG-HARO OBJECTS NEAR HERBIG Ae/Be STARS <i>Robert W. Goodrich</i>	846	124-C4
A HIGH-SENSITIVITY SURVEY OF RADIO CONTINUUM EMISSION FROM HERBIG Ae/Be STARS <i>Stephen L. Skinner, Alexander Brown, &amp; Ron T. Stewart</i>	847	124-C5
A STUDY OF CIRCUMSTELLAR ENVELOPES AROUND BRIGHT CARBON STARS. I. STRUCTURE, KINEMATICS, AND MASS-LOSS RATE <i>H. Olofsson, K. Eriksson, B. Gustafsson, &amp; U. Carlström</i>	847	124-C5
A STUDY OF CIRCUMSTELLAR ENVELOPES AROUND BRIGHT CARBON STARS. II. MOLECULAR ABUNDANCES <i>H. Olofsson, K. Eriksson, B. Gustafsson, &amp; U. Carlström</i>	848	124-C6
AN IMPROVED ULTRAVIOLET SPECTRAL LINE LIST FOR THE SYMBIOTIC STAR RR TELESCOPII <i>G. A. Doschek &amp; W. A. Feibelman</i>	848	124-C6
IUE SHORT-WAVELENGTH HIGH-DISPERSION LINE LIST FOR THE SYMBIOTIC NOVA RR TELESCOPII <i>Jason P. Aufdenberg</i>	849	124-C7
A STUDY OF METAL ABUNDANCE PATTERNS IN COOL WHITE DWARFS. III. COMPARISON OF THE PREDICTIONS OF THE TWO-PHASE ACCRETION MODEL WITH THE OBSERVATIONS <i>J. Dupuis, G. Fontaine, &amp; F. Wesemael</i>	849	124-C7
A <i>UBV</i> $\beta$ DATA BASE FOR STEPHENSON-SANDULEAK SOUTHERN LUMINOUS STARS <i>B. Cameron Reed</i>	850	124-C8
AN ULTRAVIOLET SPECTRAL ATLAS OF THE SUN BETWEEN 1190 AND 1730 Å <i>P. Brekke</i>	850	124-C8
INDEX TO VOLUMES 408-410, PARTS 1 AND 2	i	124-F1